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Disease Detection in Spinach Leaves using Image Processing and Machine Learning

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Abstract: The 45% primary sector of our nation depends greatly on the growth and development of vegetables and edible leaves especially during hot summer where that won't be a suitable period for other major staple productions. The spinach leaves paves a great role in that manner. The unhealthy leaves can cause decreased production that thus can lead indirectly to the declined development of the nation. Thus, we need to find a solution for the cause. Considering a general solution, it requisite enormous amount of work, mystery in the leaf diseases and it also needs huge amount of time. Thus, Image processing techniques along with the Machine learning algorithms can make process easier and successful. Spinach leaf disease detection and identification includes the process like acquisition, pre-processing, segmentation, feature extraction, classification and SMTP functioning. This paper discusses techniques for image pre-processing, image segmentation algorithm used for automatic recognition and research on various plant leaf disease classification algorithms that may be used for leaves disease classification.

Keywords: Image processing; Segmentation; Correlation; K-mean cluster Algorithm.

I. INTRODUCTION

India is one of the developing nations where in majority of population of country depends on primary sector in much credential manner. It has been found that the leaf disease reduces the development in the sector in more and more way. Therefore, it is important to detect and identify the disease at early stage is the very important task for farmers as it can save the whole of the crop. The naked human eye of the farmer makes them difficult to handle the identification of disease thus need to seek help from an expert individual who handle the so-called act well. So, it is important to create a solution for the particular problem. The most important thing to be considered is we must be aware of how the image would be and it must be used to compare with each other. To make it easy for the farmers we must try providing a solution that is of minimum cost and much lower effort. Thus, the solution provided is as the following i.e., the farmers can reach agencies with a simple leaf image with a mail access thus can able to reach for a solution to the cause in easier manner where the agency find the disease and its precautions will be sent to them. In this work, we propose the system which concentrates on disease detection and recognition which helpful for decision making. The proposed system consists of four main phases are pre-processing, segmentation, feature extraction and feature classification. In this paper, we focus on the image segmentation and different techniques that depends on ML.

II. LITERATURE SURVEY

Chaitali g dhaware[1], discussed about the modern technologies and method to find an automated way to find a solution for the plant disease that cannot be traced out by the farmers .The author tried using SVM in figuring out the disease. Anand R [2], discussed a disease detection method for brinjal plant leaves. The brinjal plant leaflet images are received the usage of digital camera. The algorithm makes use of an aggregate of various strategies inclusive of border segmentation method, morphological processing and filtering technique used for categorizing input images into some disease class as bacterial wilt, cercospora, tobacco mosaic virus. R.P Narmatha [3], discussed a disease detection in paddy using segmentation victimization Otsu's thresholding and K- means clustering.

The first images area units regenerate to HSV color space and therefore the V part is used for multi-thresholding. Sam abraham [4], explained method for resilient in the disease detection of bitterguarg and advance identify of leaflet patch in sugar beet. For capturing images, Nikon photographic camera was used that was mounted on a stand to stay constant distance. The author used white background whereas capturing images to avoid the additional complications in process. The method implements hybrid methods of guide matching and support vector machine. This technique usage color primarily forms options for segmentation, orientation code matching and support vector machine classifier for final malady classification. Dheeb Al Bashish et al. [4], examined the strategy to detect the plant leaf disease exist on leaflet and cane. The presented system is together of K-Means segmentation method and neural network used for classification of segmented images. Classification demonstrated average precision of 93%.

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III. PROPOSED APPROACH

The proposed approach comprises of four fundamental stages: Image acquisition of plant leaf images, pre-processing of images, image segmentation, feature extraction and classification of images in different disease classes. [3] The following fig. shows the general flow of system. In proposed work the primary stage is the acquisition of leaf images with the use of mobile camera which have minimum 2 megapixels and above resolution. The dataset consists of healthy leaves and infected leaves images. In next stage the pre-processing techniques are apply on input leaves images for better results in next processing. Image resizing is one of the major tasks in order to keep up the consistency as far as size of the images. Next stage is extracting the features like color, correlation, texture etc. from the leaf image. The extracted features are used for classification of leaves in classes like healthy and diseased leaves images. The output of classification is used for the decision support system to gives the decision related health of plant leaves.

A. Image Acquisition: The leaf images of plant are acquired by using the camera of mobile. [2] The dataset contains 120 images of healthy, infected leaf images set. Dataset having mainly two classes of image set- one if healthy leaf images and second class contains the infected leaf images which have disease wise sub classes.

B. Pre-Processing: The pre-processing stages are applied on given image in order that made it appropriate for additional process. The primary pre-processing stage is to resize the given input image. [1] The initial size of image is large that occupy longer for process time. Therefore, each image is converting into 512 X 512 sizes to evade prolonged. The following stage is to conversion of RGB to Hue Saturation Value (HSV). After that segmentation techniques are applied.

C. Segmentation: Segmentation of image is applied for background Subtraction[4]. Two main techniques are mainly used for background subtraction: cluster based and colour based. The proposed system will give better results using cluster subtraction. In colour based subtraction unwanted background is removing by using R, G and B elements. Which pixel have G element more than the R and B that are keep and other part is removed. In cluster based background subtraction, the connected elements in the image are discovered out. The immense part of the image is kept and other part is removed.

D. Classification: After segmentation next stage is feature extraction. The feature extraction technique permits to extract the properties of an image which is able to facilitate in accurate classification. The co-relation, energy, homogeneity etc. are the features are used for analysis. [2] There are several of approaches that are used for image classification. A number of the strategies are principal component analysis (PCA), fuzzy logic, K-nearest neighbor (KNN), support vector machine (SVM), artificial neural network (ANN), neuro- fuzzy interference system, etc. [2]. In KNN method classifies images with using nearest distance between trained dataset and testing dataset. Choosing the appropriate value for k is major drawback of KNN. The ANN applies estimation functions that depend on lots of inputs given to the system, which are known. The disadvantage of this method is over fitting problem. The correlation technique is used to deal with less number of data available cases.[4] It is a signal matching technique important component for radar, sonar etc.

There are two types of correlation:
- Linear
- Circular

E. SMTP Functioning: This is the way by which we send back the identified disease information along with the detailed precautions into mail.

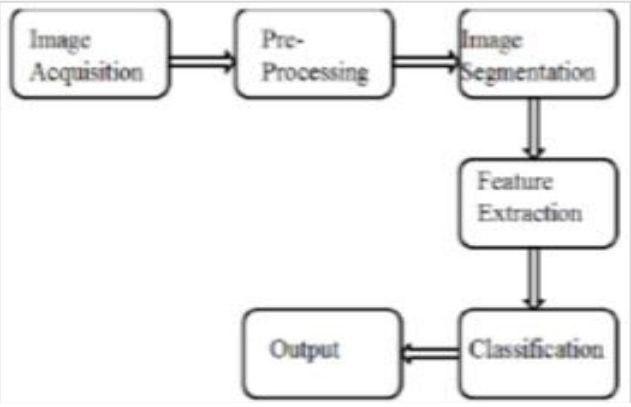

Fig. 1Flow of System

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IV. RESULT AND DISCUSSION

The figure 2 shows some images of healthy plant leaf and figure 3 show the diseased and infected leaf images. In this approach, we apply techniques on various diseases like sun burn, yellow-mosaic and grass hopper etc. The figure 4 shows the input image given to system. The final output given by the system is shown in figure 5. The system gives the
output as healthy leaf or diseased, if leaf is infected then system will give disease type by using classification. The availability of dataset is greatly depended by output accuracy here it is about 85% with the used K Cluster Machine Learning Algorithm.

Fig. 2Healthy leaf

Fig. 3Diseased leaf

Fig. 4Input Image

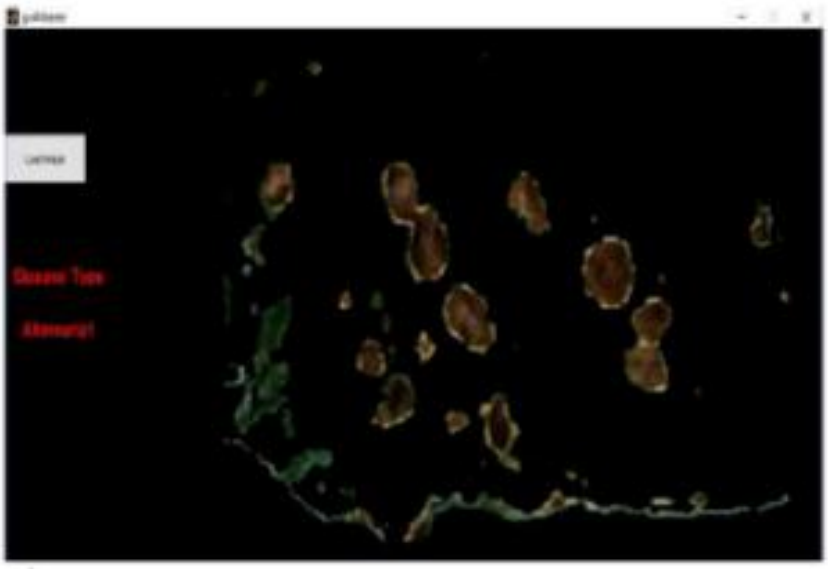

Fig. 5GUI Interface

V. OUTPUT AND CONCLUSION

Output:

The mail where disease identified as cercospora and precautions will be provided as

- Burry the infected crop residue and destroy plant.
- Start with certified disease-free crop seed before planting.
- Avoid plant succession. Crops closed together.

So, the paper could able to provide a solution to the problems of farmers who can't able to identify leaf disease that is a major problem in the yield, it gives an 85% result accuracy. If the availability of dataset increases and if we can use Deep learning technique then it can increase the accuracy level of the output availability.

REFERENCES

[1]. A Modern Approach for Plant Leaf Disease Classification which Depends on Leaf Image Processing, Chaitali G.Dhaware.
[2]. An application of image processing technique for detection of diseases on brinjal leaves using K-Means clustering method,Anand R.
[3]. Detection and measurement of paddy leaf disease symptoms using image processing, RP Narmatha.
[4]. Early detection of alterneria blight disease in bitterguard leaves using image processing, Sam Araham.2002)

BIOGRAPHIES

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